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ABSTRACT

The first-year performance of freshmen between 1987 and 1992 was investigated for evidence of grade inflation. Grade inflation is defined as "when a grade is viewed as being less rigorous than it ought to be". Performance data were analyzed for fall semester admissions of full-time, first-time freshmen at the University of Missouri System for the 5-year period. The study population included 23,064 students who completed the "core" courses in high school, had valid first-year grade point averages (GPA), high school percentile ranks, and American College Testing (ACT) Program Enhanced or Equated Enhanced Composite test scores. The mean first-year GPA system-wide increased from 2.67 to 2.76 between 1987 and 1992. System-wide, the mean ACT Composite score increased from 24.39 in 1987 to 25.27 in 1992. Mean high school percentile rank for these students increased from 75.24 to 80.56. The primary predictors of first year GPA were found to be high school percentile rank and ACT Composite scores. Since both of these indicators rose during the period, the subsequent increases in mean GPA were not unexpected. Appendices provide detailed tables showing changes in the mean ACT Composite scores, high school percentile ranks, and GPA. (Contains 21 references.) (SW)

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Indicators of Grade Inflation

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by

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Indicators of Grade Inflation

In the past several years there has been renewed interest and concern over "grade inflation". Those expressing these concerns, based primarily on mean grade point average (GPA) of undergraduate students or on the number of A's, B's, etc, awarded, tend to explain grade inflation as symptomatic of the "Lake Woebegone" syndrome and fail to account for other factors that influence grade inflation. These include such factors as changing student abilities, tightening admissions policies, and lighter student credit hour loads. At the University of Missouri, the increase in first-year GPA of freshmen with like abilities and credit hour loads between 1987 and 1992 were not greater than predicted, given the increases in average ACT Composite scores and high school percentile ranks.

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Jean Endo
Editor
AIR Forum Publications

Indicators of Grade Inflation

Introduction

During the 1987 - 1992 period, the mean first-year GPA earned by first-time freshmen at the University of Missouri steadily increased from 2.67 to 2.76, prompting renewed concerns over grade inflation. However, the two major descriptors of student preparation for college - the ACT Composite score and high school percentile rank - also went up. The mean ACT Composite score increased from 24.39 to 25.27, while mean high school percentile rank rose from 75.24 to 80.56. This study investigates the first-year performance of these freshmen cohorts between 1987 and 1992 for evidence of grade inflation. For the purposes of this report, grade inflation is defined as "...when a grade is viewed as being less rigorous than it ought to be" (Milton, Pollio, and Eison, 29).

Grades, and naturally the possibility of grade inflation, have continually been debated over the past two hundred years since Yale introduced a formal grading scale in 1783 (Milton, Pollio, and Eison, 1986). Not surprisingly, this debate has produced few agreed-upon conclusions. There are still concerns and discussions over the purposes and utility of grades (S.G.B., 1840; Dressel, 1976; Evans, 1976; Spady, 1987; Hargis, 1990). Grade reliability and validity also continue to be debated (Hall, 1906; Meyer, 1908; Starch and Elliot, 1913; Warren, 1983; Smith, 1992). Likewise, questions concerning the number of levels on the grading scale, and whether or not it has become easier or harder for students to achieve a particular ranking on that scale, also persist. It is also interesting to note that "grading on the curve" has been a topic of discussion for some time.

Most histories of grading policy, and in particular the use of the curve, give Dr. Max Meyer

considerable credit for influencing the acceptability of grading on the curve. During the early 1900's, Dr. Meyer was a professor of experimental psychology at the University of Missouri. His work in analyzing problems the University was having assigning grades and his proposals for correcting these problems (Meyer, 1908) gained wide influence as did several of his latter studies defending the grading system adopted by the University (Meyer, 1911 and 1914). Dr. Meyer sought to bring some degree of uniformity into higher education grading practice by recommending the University adopt a five-point grading system. In this system, every student in every section would be ranked by the faculty. Once ranked, grades would be determined on a preset scale approximating the "bell" curve with 3% of the population at either end representing the best and worst students, 22% representing those between the average and the best and worst students, and 50% of the population in the middle representing the average. Dr. Meyer also recommended continual and periodic review of grades assigned by faculty as well as the use of what could now be described as the University's current policy of assigning quality points based on grades and earned credit hours. It is also interesting to note that Dr. Meyer was fairly well opposed to any grading scale having more than five points, as he believed that assigning grades to such a level of precision tended to make grades more a matter of chance than heightened accuracy.

According to Dr. Meyer, the University's grading system in 1903 had the following scale: A, B, C, D, and E (Meyer, 1908). Both the D and E grades were considered failures; however, a student receiving a D could retake the final exam. The policy adopted after Dr. Meyer's research also had five grade levels; these were: E (excellent), S (superior), M (medium), I (inferior), and F (failure). These five points represented Dr. Meyer's top 3%, above average 22%, average 50%, below average 22%, and bottom 3%. Current policy at the University continues the five-point scale, but uses the

following lettering system: A, B, C, D, F representing, respectively, outstanding work, superior but not outstanding work, adequate work, performance marginally meeting minimum standards, and unacceptable performance (MU Faculty Handbook). Some variation with the current system is allowed by permitting S/U (satisfactory/unsatisfactory) grading, the use of W and WF (withdraw and withdraw-failing), as well as the use of I (incomplete). In determining grade point average (GPA), the letter scale is given the following values: A = 4, B = 3, C = 2, D = 1, F= 0 and W, WF, and S grades are not used to determine GPA. Current policy makes no mention as to who the reference group is - be it all undergraduate students, all entering freshmen, or, as with Dr. Meyer, all students enrolled in a particular section and all students taught by a particular faculty member.

Concern over grade inflation has been a recurrent theme in higher education (Milton, Pollio, and Eison, 1986). However, there appears to have been greater concern over grade inflation during the last 30 to 40 years and most specifically during the 1960's and 1970's. For some, the use of "grading on the curve", in conjunction with the movement toward more selective admissions, has acerbated grade inflation. There is a widespread belief that it is unfair to penalize high-ability students by using a curved grading system simply because their peers were also of high ability (Mayhew, Ford, and Hubbard, 1990).

Grade inflation studies that take into account changes in student characteristics and abilities were not as readily available for review. One of the earliest studies showed that while standardized entrance test scores went up at Michigan State University between 1958 and 1962, the mean freshmen GPA remained fairly stable (Juola, 1968). A subsequent study looking more specifically at particular undergraduate courses found that when mean GPA went up, mean aptitude test scores fell (Prather, Smith, and Kodras, 1979). A study completed in 1984 showed that certain student

characteristics, such as class standing and first year of study, accounted for a significant amount of variance in GPA over a five year period (Stage, Okun, Stock, and George, 1984). Unfortunately, this study did not look at standardized measures of student preparation for college or aptitude and left unknown is whether the significance of the first year of study was due to easier grading or better prepared students.

Methodology and Study Population

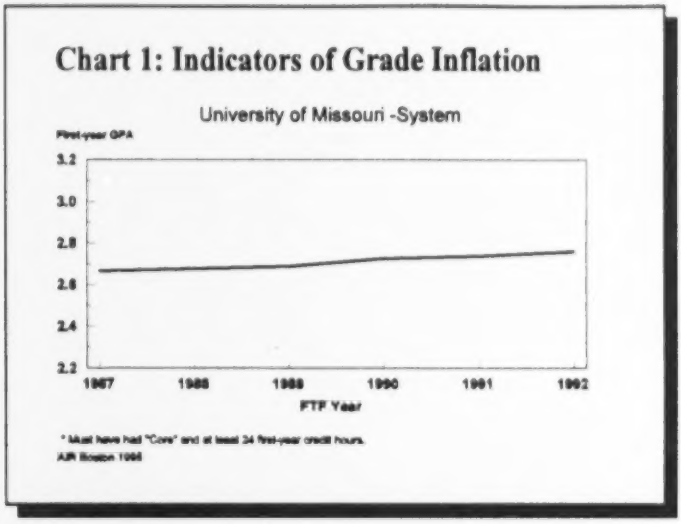
Data used for this report came from fall semester admissions and first-year performance records of full-time, first-time freshmen students admitted to the University of Missouri System between 1987 and 1992. The study population included 23,064 students who completed the "core" courses in high school, were enrolled full-time, and had valid first-year GPA's, high school percentile ranks, and an ACT Enhanced or Equated Enhanced Composite test scores. High school "core" was defined as four, year-long units of English, three of math, and two each in social studies and science. Since "core" data for UMR during the 1987 and 1988 years were not available, these two years for UMR were dropped from the study. Full-time enrollment was defined as having completed at least 24 college credit hours during the first year of study. These definitions were used in order to better describe what might be termed the "traditional" freshmen student.

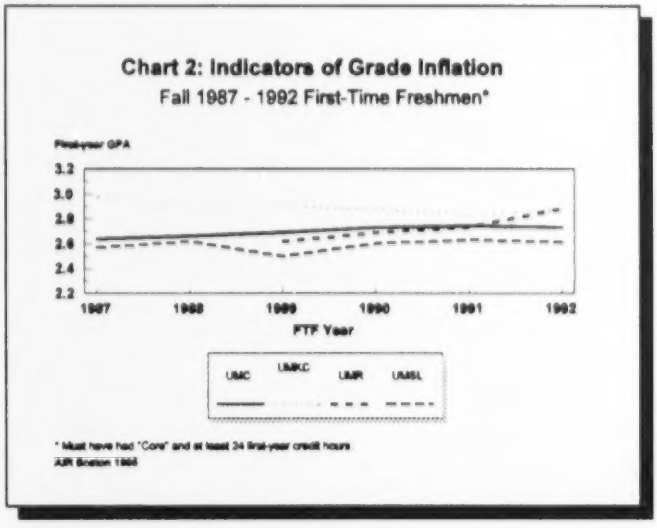
In order to establish the relationship between ACT Composite scores and high school percentile rank, correlations were run using the *Statistical Analysis System* (SAS) software. In addition, regression analysis was conducted using SAS to describe the relationship between ACT Composite scores, high school percentile ranks, freshmen year, and first-year GPA. First-time freshmen year was converted into a dichotomous variable, having a value of 1 or 0, for regression

purposes. It was anticipated that evidence of grade inflation would be shown by each of the freshmen-year variables having some statistical significance in predicting first-year GPA.

Discussion:

As shown in Chart 1, the mean first-year GPA system-wide increased from 2.67 to 2.76 between 1987 and 1992. At the campuses, the first-year GPA of freshmen increased the most at UMR, going from a mean of 2.62 in 1989 to 2.88 in 1992 (see Chart 2 below). At UMKC, mean GPA went down between 1987 and 1992, going from 2.98 to 2.88. At UMC and UMSL, the mean GPA increased from 2.64 to 2.73 and from 2.57 to 2.61 respectively. Detail tables showing changes in the mean ACT Composite scores, high school percentile ranks, and GPA are included in the appendix (Table A).

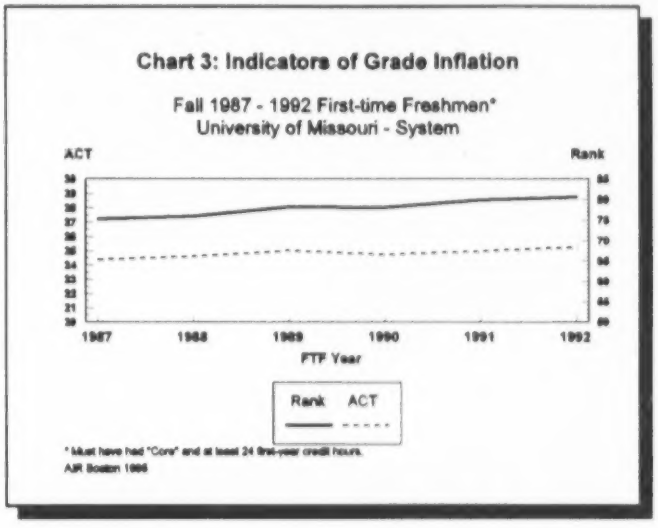


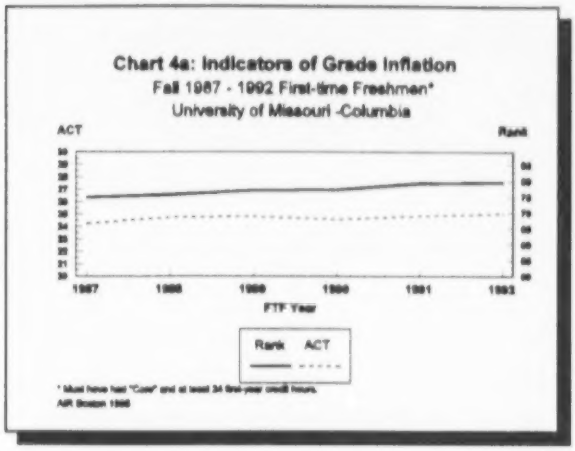


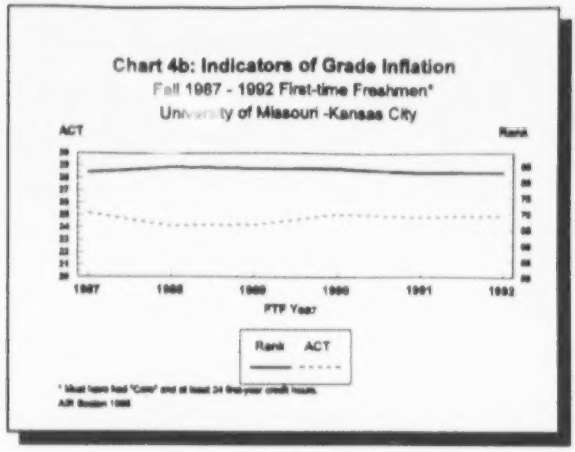
On the surface, these increases appear to support the conclusion that grade inflation is occurring with first-

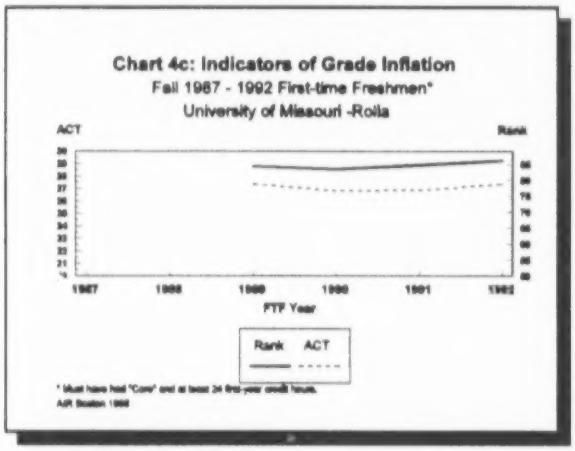
time freshmen enrolled between the fall of 1987 and 1992. However, changes in student characteristics and abilities must also be considered before this conclusion can be reached with any degree of certainty.

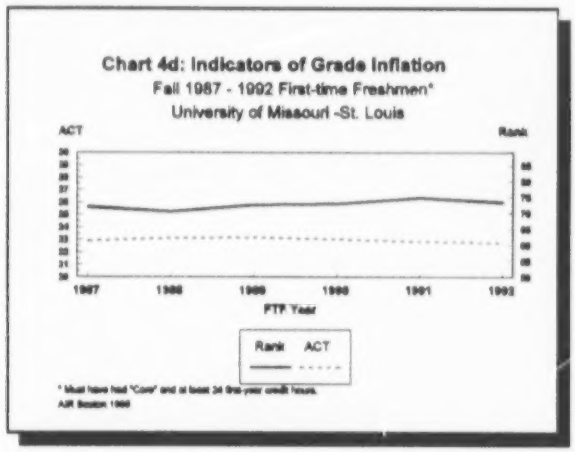
The steady increase in the average GPA was also accompanied by increases in the mean Enhanced or Equated Enhanced ACT Composite scores and high school percentile ranks of the students admitted during the same time period. System-wide, the mean ACT Composite score increased from 24.39 in 1987 to 25.27 in 1992 (Chart 3 right). Mean high school percentile rank for these students also increased at a fairly steady rate, going from 75.24 to 80.56. As depicted in Charts 4a - 4b (page 8), mean high school percentile ranks also increased during the study period at all campuses except UMKC where the mean percentile rank stayed at around 83. ACT Composite test scores remained more steady, with a moderate increase at UMC while decreasing slightly at the other campuses.











A comparison of the percent increases in ACT scores, high school percentile ranks, and first-year GPA's during this period, is shown in Table 1 (page 9). As indicated in the table, mean first-year GPA's increased 3% across the system while mean ACT scores increased 4% and mean high school percentile ranks increased 7%. Similar increases were found at UMC, while the other campuses

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showed a less consistent pattern. UMKC, UMR, and UMSL showed minor decreases in the mean ACT score. High school percentile ranks at UMR and UMSL increased by 2% while at UMKC they remained virtually the same. Surprisingly, while UMC and UMSL showed small increases in the mean first-year GPA of 3% and 2% respectively, there was a decrease of 3% at UMKC and a rather large increase of 10% at UMR.

Table 1: Change in Mean ACT Composite Score, High School Percentile Rank, and First-year GPA
1987 - 1992

	N	ACT 1987	ACT 1992	ACT %	High School % Rank 1987	High School % Rank 1992	High School % Rank %	First-year GPA 1987	First-year GPA 1992	First-year GPA %
System	23,063	24.39	25.27	4%	78.34	80.66	7%	2.67	2.76	3%
UMC	16,949	24.25	25.00	3%	74.70	79.52	6%	2.64	2.73	3%
UMKC	1,864	25.20	24.91	-1%	82.98	82.87	-0%	2.98	2.88	-3%
UMR*	2,402	27.39	27.36	-0%	84.25	86.06	2%	2.62	2.88	10%
UMSL	1,849	22.88	22.73	-1%	71.90	73.35	2%	2.57	2.61	2%

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* Based on 1988 - 1992

Analysis shows that GPA and ACT Composite score have a fairly strong relationship ($r = .44$, $p=.0001$) while the relationship between GPA and high school percentile rank is somewhat stronger ($r = .51$, $p=.0001$). As found in other studies (Chatman and Mullen, 1992), the relationship of GPA to both ACT and high school rank is even stronger ($r = .57$, $p = .0001$). However, results of the regression analysis (see Table 2), using the full model including ACT Composite score, high school percentile rank, and freshmen year does not enhance

Table 2: Regression Parameter Estimates

	System Estimate	System Prob>|T|	UMC Estimate	UMC Prob>|T|	UMKC Estimate	UMKC Prob>|T|	UMR Estimate	UMR Prob>|T|	UMSL Estimate	UMSL Prob>|T|
Intercept	0.2939	0.0001	0.2306	0.0001	0.1875	0.0727	-0.5295	0.3577	0.4935	0.0001
ACT	0.0498	0.0001	0.0517	0.0001	0.0602	0.0001	0.0531	0.0001	0.0530	0.0001
Rank	0.0154	0.0001	0.0153	0.0001	0.0153	0.0001	0.0221	0.0001	0.0121	0.0001
1988	-0.0123	0.3874	-0.0068	0.6566	-0.1208	0.0121	.		0.0491	0.3308
1989	-0.0560	0.0001	0.0046	0.7642	-0.0904	0.0619	-0.1658	0.7719	-0.0976	0.0459
1990	-0.0015	0.9155	0.0612	0.0009	-0.1109	0.0250	-0.0443	0.9383	0.0069	0.8528
1991	-0.0300	0.0326	0.0158	0.3207	-0.1257	0.0132	-0.0418	0.9418	0.0252	0.6115
1992	-0.0305	0.0348	-0.0145	0.3802	-0.0763	0.1268	0.0645	0.9102	0.0259	0.6346

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statistical predictions of first-year GPA. For the system as well as for each campus, ACT test score and high school percentile rank have some statistical significance in predicting first-year GPA. However, freshmen year does not have a consistent pattern of statistical significance at the system or at any of the campuses. The only in which freshmen year exhibits statistical significance at the system level was 1989 where the regression parameter was negative and implied some degree of grade deflation. Thus, it appears that the increases in mean first-year GPA is the result of better prepared students rather than a relaxing of grading standards.

UMR presents an interesting case with a 10% increase in mean GPA between 1989 and 1992. However, regression parameters presented in Table 2 above show that freshmen year was not statistically significant in predicting mean first-year GPA's for any year at UMR. Thus, the data indicate that UMR's mean GPA in 1989 was lower than what would have been predicted and that in subsequent years, mean GPA's more closely matched their predicted levels, given ACT scores and high school ranks of the entering students.

Conclusions

It was expected that if faculty had been grading easier over time, freshmen year would have had some statistical significance. However, freshmen year was shown not to be statistically significant. The primary predictors of first-year GPA remain - ACT Composite test score and high school percentile rank. Since both of these indicators rose during the period, the subsequent increases in mean GPA were not unexpected. As the quality of preparation for college work increased, so too did the mean GPA of freshmen. This study indicates that policy initiatives to address concerns over the increased mean GPA between 1987 and 1992 need to be approached differently than if the case

had been simply one of more liberal grading by faculty. Thus, admissions policies as well as changes in student ability need to be linked to grading policies. As mentioned earlier, some believe that the prevailing use of grading on the curve has contributed to grade inflation at selective institutions, especially when the peer group is left undefined. As the University of Missouri implements more selective admissions standards, it is expected that some grade elevation will occur and that grading policies need to be reviewed in conjunction with admission policy changes.

Appendix

Table A: Indicators of Grade Inflation,
Fall 1987 - 1992 First-time Freshmen Students*

Year	N	ACT Mean	ACT Std Dev	High School % Rank Mean	High School % Rank Std Dev	GPA Mean	GPA Std Dev
University of Missouri - System							
1987	3,290	24.39	3.75	75.24	20.47	2.67	0.07
1988	3,671	24.63	3.72	75.95	19.59	2.68	0.72
1989	4,512	24.04	3.82	78.17	18.15	2.69	0.72
1990	4,263	24.74	3.92	78.10	18.49	2.73	0.70
1991	3,885	24.99	3.85	79.91	16.79	2.74	0.72
1992	3,443	25.27	3.92	80.56	16.56	2.76	0.71
1987-1992	23,064	24.85	3.84	78.03	18.45	2.71	0.72
University of Missouri - Columbia							
1987	2,715	24.25	3.72	74.70	20.64	2.64	0.73
1988	3,038	24.73	3.66	75.57	19.71	2.66	0.72
1989	3,170	24.78	3.71	76.89	18.44	2.69	0.71
1990	3,014	24.54	3.83	77.17	18.66	2.73	0.69
1991	2,687	24.83	3.70	79.19	16.79	2.74	0.71
1992	2,325	25.00	3.78	79.52	16.79	2.73	0.70
1987-1992	16,949	24.72	3.73	77.08	18.70	2.70	0.71
University of Missouri - Kansas City							
1987	306	25.20	3.88	82.98	17.10	2.98	0.70
1988	331	25.12	4.09	84.58	14.40	2.88	0.71
1989	384	25.21	3.94	84.10	15.72	2.90	0.74
1990	296	25.09	4.03	84.20	15.61	2.88	0.73
1991	269	24.80	3.79	82.91	16.84	2.83	0.73
1992	278	24.91	4.12	82.87	16.54	2.88	0.76
1987-1992	1,864	25.07	3.96	83.66	16.00	2.89	0.73
University of Missouri - Rolla							
1987	**						
1988	**						
1989	610	27.39	3.58	84.25	14.87	2.62	0.74
1990	568	26.81	3.71	83.38	16.50	2.69	0.75
1991	606	26.88	3.72	84.75	14.58	2.73	0.72
1992	617	27.36	3.64	86.06	13.36	2.88	0.68
1987-1992	2,402	27.11	3.67	84.63	14.86	2.73	0.73
University of Missouri - St. Louis							
1987	269	22.88	3.48	71.90	20.39	2.57	0.67
1988	301	23.12	3.61	70.34	20.46	2.62	0.69
1989	348	23.14	3.23	72.57	19.17	2.50	0.70
1990	385	23.00	3.62	72.85	19.20	2.60	0.67
1991	323	22.84	3.85	74.75	18.06	2.63	0.73
1992	223	22.73	3.44	73.35	17.51	2.61	0.69
1987-1992	1,849	22.97	3.55	72.55	19.21	2.59	0.69

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* Must have had high school "core" and 24 or more first-year credit hours.

** High school core data not available.

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